

Field Change Order

FCO 70400042

Optimus RAD release upgrade to 3.8 Only USA



BuckyDiagnost & Cosmos

DOCUMENT HISTORY:

Revision	Revision date	Reason of changes
AA	Jan. 7, 2011	First issue

CSIP Security Labeling: CSIP Level 1:

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APPLIES TO:

Geography:	Worldwide
Traceable item identification (12NC):	9890 000 02001
Range of serial numbers (if applicable):	SN Optimus generator: ≥ 970218 and ≤ SN061263 (delivered: from May 1997 - January 2007)
Physical sub, main block(s) and system code(s) identification where the affected item could be present:	70410/11/12/14/15, 704030/35, 704020/21/22, 704031/32, 704060/62, 704016/17/18 Main block: PB000135 Sub block: PB010005, PB010032, PB010033
Any other type of system identification number used by the BG/BU:	Optimus generator with FW vers. ≤ 3.6 (delivered: from May 1997 - January 2007) Control panel 9890 000 02403/-04/-05/-06/-07/-08 (delivered with SN: ≥ 9701016 and ≤ SN070056)

REMOTE SOFTWARE INSTALLATION:

Is this a software "ONLY" FCO: Yes

Can the software be installed on the equipment remotely: No

Procedure: Update of the SW with latest release

OPPORTUNITIES FOR FCO IMPLEMENTATION EFFICIENCY:

N/A

SUPERSEDES INFORMATION:

N/A

INTRODUCTION:

Symptom : Exposure parameters like kV, mA or mAs seem to change without a button having been touched.

List FPR(s) solved (if applicable)
PR # 333162; 342432; 366270

Cause : If one pushes continuously (longer than a second) the + or – button to change any of the exposure parameters, the generator SW switches into an auto-stepping mode, so that the data continues to change (up or down). This function is specified and stops, whenever you release the button.

If you are in the auto-stepping mode (or within less than 200ms after release of this function) AND also the exposure switch is pressed, the auto-stepping mode does NOT stop.
This might lead to unwanted parameter settings.

Remedy : Upgrade of the generator SW to latest version release 3.8

MANPOWER / TIME TO COMPLETE:

1 service engineer / 1.0 hour

APPLICATION TRAINING REQUIREMENTS:

No

COMPLIANCE TESTING:

No

TOOLS & TEST EQUIPMENT:

Tools	Tool code / 12NC
Standard tool kit	TC129
Service engineer PC, IST and AGenT latest version	TC 092
PLCC extraction tool AMP 822154-1	2422 487 89772

MODIFICATION KIT / PARTS REQUIRED:

Modification kit and/or parts 12NCs	Description
N/A	N/A

New firmware included in: AGenT 5.3, use Zeppelin tool CD or download from InCenter.

[Link to Zeppelin ToolBox](#)

FCO KIT CONTENTS:

Non-traceable items

Item 12NC	Description
N/A	N/A

Non-serialized trace items

System code	FCO document	Outbound item	Inbound item	Parent material number	Software release description (N/A when HW)	Software patch level (N/A when HW)
Trace items (OIs) that must be installed/exchanged/removed (MP1 OI-table)						
N/A	N/A	N/A	N/A	N/A	N/A	N/A

Ordering information: Order the indicated material/kit according to the standard local service logistic procedures.

INSTALLED BASE REGISTRATION:

This FCO has impact on the installed base registration.

Make sure your local installed base registration is or gets updated with the 12NC numbers (and/or serial numbers) as stated in the **trace item tables** under “FCO Kit contents”.

PROCEDURE:

1 PREPARATIONS

1.1 Off-site preparations

- Check the system status.
 - System compatibility
 - Check pre-requisites for this action
 - Other applicable FCOs

FCO00135004	Error combination 00XI + 00M3
FCO00135006	Upgrade to release 3.3
FCO00135009	Electric shock during service activities (50kW only)
FCO00135014	Firmware update kV-control (65/80 only)
FCO00135016	Error 00 TH during tube adaptation
FCO74200006/7	Transport wheel problems with generator cabinet 40E
FCO74200008	Tomo program selection not possible
FCO74200015	IGBT over-current supervision for Optimus RAD/RF/C converter
FCO74200019	Low-speed rotor control power resistor exchange
- Arrange the visit.
- Arrange the required tools and required firmware.

1.2 Back-up

1.2.1 Establishment of the PC-generator connection

- If IST is not already started on the PC, start it now.
- Establish connection with the data cable between PC and generator.
Start AGenT by clicking on the respective icon.

1.2.2 Saving of the CMOS (CU complete), APR and error log

- Use AGenT to save the current data.



- Download the actual CMOS (filename e.g. CU97xxxx. TDL = serial number of generator)
It takes about 15 minutes to save the data to the disk.
The default backup name: **CUBACKUP.TDL** can be changed into any other file name.
The path (hard disk) is automatically taken into account.

NOTE



The CMOS backup file can be used as restore source after the SW upgrade, if required.
A new backup after the upgrade procedure is **not** necessary.

2 FCO IMPLEMENTATION

CAUTION



Use proper ESD grounding techniques when handling components
Wear an antistatic wrist strap and use an ESD-protected mat.
Store ESD-sensitive components in antistatic bags before placing them on any surface.

2.1 ESTABLISH PC / GENERATOR CONNECTION

- Start AGenT by clicking on the respective icon.

The actual exposure counter table must be recorded. These tables get lost after flash loading of release 3.8. They are replaced by the improved counter table of release 3.8.

AGenT / Acceptance / Inspect / Tube 1 ... 3 / Type and Statistic of Tube 1 ... 3

- Enter the counter table(s) in the system log book.
- Keep the PC / generator data connection established and the AGenT program running at the PC, switch the generator OFF.

2.2 PREPARATION OF THE GENERATOR

2.2.1 Preparation of generators without a CAN interface:

- Switch ON the generator.
The loading process can be started once relay ENK1 has been energized.

2.2.2 Preparation of generators which are connected via a CAN interface:

BuckyDiagnost TH and TH2

- Switch OFF the generator.
- Disconnect the following plugs:

System	EZX23 signal bus	Connector EZX42 or EZX42-1 system CAN	EZX43 or EZX43-1 system CAN
BuckyDiagnost TH / TH2	X		X

NOTE



The download procedure must not be started before relay ENK1 has been energized at least 2 minutes after the generator has been switched ON.

CAUTION



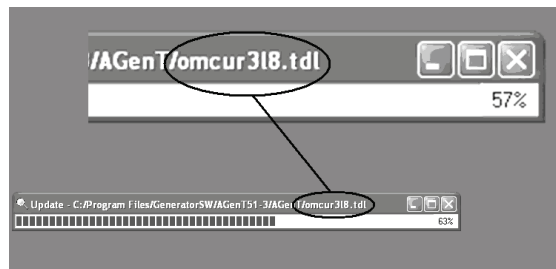
*Connection between service PC and generator must be established.
For the backup of data the service PC must be operated on mains. It must not be operated with batteries. The screensaver must be deactivated.*

2.3 LOADING OF GENERATOR CU FIRMWARE RELEASE 3.8

- Switch ON the generator.
- Select menu:
AGenT / Program / Update Generator Firmware (XRG 90 RAD/RF,C)
- Select the respective update file (OMCUR3L8.TDL) and click on "Open" with the left mouse button.

The reset can be performed within the next forty seconds, either on PCB EZ 139 S1 or on the ON button of the control module.

During the update process a progress bar is displayed on the screen which indicates how much of the update is completed.

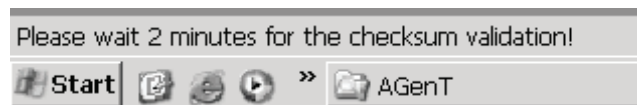


Depending on the type of PC data transmission takes 15 ... 30min.
During this process all red LEDs of the function unit are blinking.

CAUTION



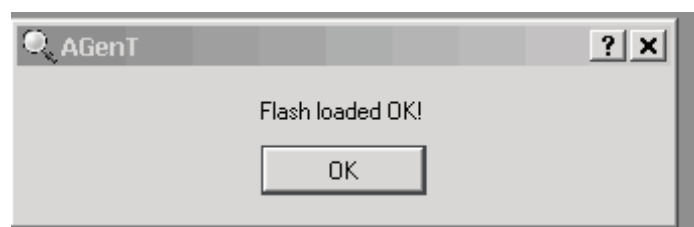
When the data transmission to the generator is completed, the message to wait for two minutes appears on the screen.



WARNING



This process must under no circumstances be disturbed!
At the end of this sensible procedure
"Flash loaded ok" appears on the screen.
Only now the AGenT program can be terminated.



- Reset the generator.

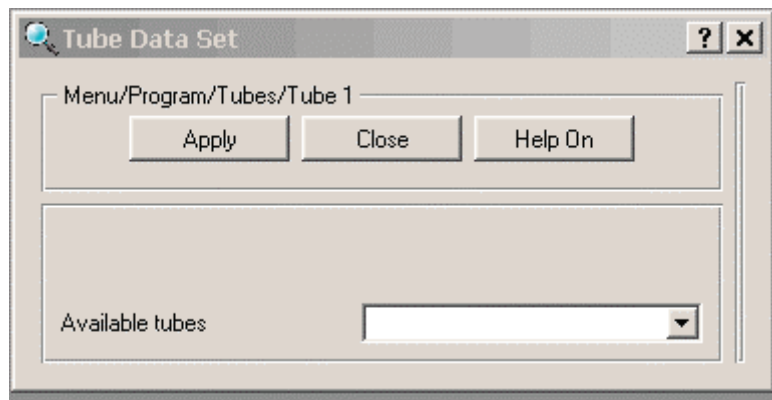
2.4 TUBE DATA FILE UPGRADE

Tube data for the temperature calculation have been improved. This requires that all tubes have to be re-programmed followed by a re-adaptation. The generator must still be disconnected from the system CAN during tube data loading (TUBE_R3.TDL file date 23.5.2008).

2.4.1 Tube data set

The loading process

- Select menu:
AGenT / Program / Tubes / Tube 1 ... 3 / Tube Data Set



- Click on the arrow with the left mouse button in field "Available tubes". All the permitted combinations of tube and housing type are listed in a window.
- Select the respective combination of tube type and housing type from the list and click on "Apply" with the left mouse button.
- Reset the generator. Then the data which have been configured up to now are read by the processor when the system is started.

2.5 Tube adaptation

All filaments have to be adapted afterwards. If possible, monitor the kV waveform during adaptation.



WARNING

Radiation is released during the adaptation procedure!

2.5.1 General information

Tube adaptation is an automatic process which includes:

1. The measurement of the mA offset value that is caused by:
 - the kV measuring circuit
 - the emission current feedback circuit (VCO).
2. The measurement of the individual standby filament current (based on 100µA).
3. The emission current characteristic as f (kV, filament current).
4. The dynamic behavior (positive and negative boost adaptation) where the inertia of the filament with respect to heating up and cooling down is registered.

NOTE



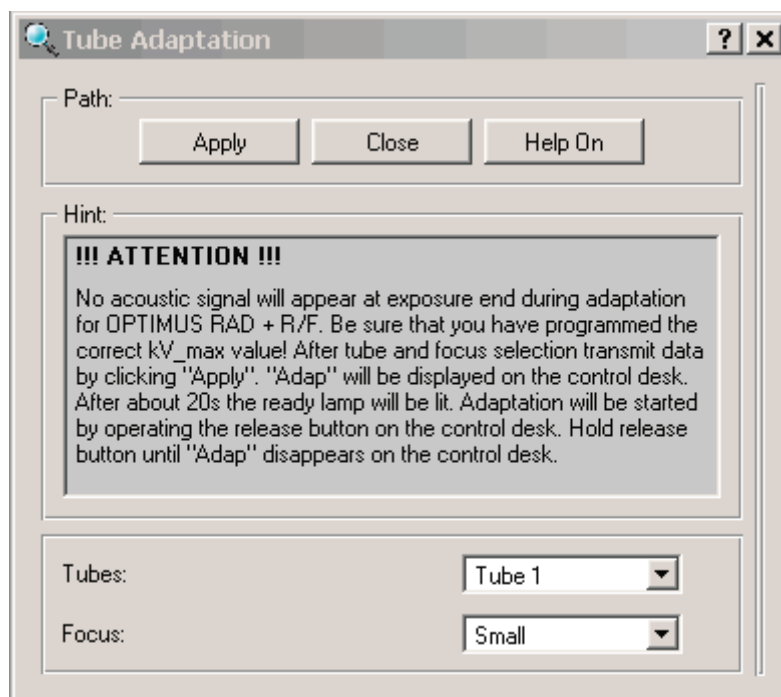
*In case of problems check the symptom / solution list at the end of adjustment chapter in Optimus Service Manual chapter F.
Repeat the adaptation for this particular focus.
The adaption procedure must not be started before relay ENK1 has been energized at least 2 minutes after the generator has been switched ON.*

- The tube must be conditioned as described in chapter 9. “Tube conditioning” of the Optimus Service Manual.
- Check the upper kV limit
Select menu AGenT:
*Program / Tubes / Tube Limits / **Max. Tube Voltage Limit [kV]**.*
- The programmed value should match the nominal value of the tube connected or in case of older tubes the upper kV limit should be set to the max. application kV.
Once an adaptation is completed the new limit value is indicated as ADAPTED TO [kV].
- Perform the following program settings temporarily for each tube connected to one of the assigned RGDVs = Free cassette
Select menu AGenT:
*Program / RGDV set A + B / RGDV 1 ... 8 / **Data Set A***

Programming	Temporarily	Original tube
Enable handswitch	YES	Verify the customized entries in 2Z-2.x at the end of this manual
Syncmaster present	NO	
Exposure switch type	Double step	
Exposure series / Tomo	Yes	
Mounted radiographic	NONE	

2.5.2 Procedure

- Reset the generator.
- It is recommended that the high voltage be monitored during adaptation.
Connect the scope:
Channel1: kV AV HT at EZ130 X3 (1V/div), scale: 20kV/V
Trigger external: CTRL_X_C/ at backpanel EZ X74, negative slope
Time base: 2ms/div
- Select the RGDV = Free cassette for the tube to be adapted.
- Select menu AGenT:
Adjustment / Tube Adaptation
- Select the tube and focus to be adapted, start with the small focus!



NOTE



*To avoid any malfunction make sure that **READY** is displayed on the desk before data are transmitted by clicking on "Apply" with the left mouse button:
READY state disappears, **ADAP** is displayed on the desk.
Wait until the generator turns back to the **READY** state.*

- Start the adaptation process by pushing the handswitch in PREP and EXP position and keep it depressed in the EXP position.

The generator switches about 125 exposures for each focus. The radiation sign at the desk indicates exposures but there is no beep at the end of each exposure.

The actual kV parameters are displayed during adaptation.

The generator carries out the adaptation automatically. The procedure for one focus is completed when the desk indication changes from ADAP to TEST. At the end of the adaptation process the following message appears on the PC screen: "Before continuing the generator must be reset".

- NOTE**

As there is no tube type with a physical third (middle) focus yet, the third focus cannot be adapted. VARIOFOCUS values are calculated by adapted small and large focus. APR programs using VARIOFOCUS can only be selected until small and large focus are both adapted.

- ## 2.6 Final tube adjustment work

- - Switch OFF the generator.
- - Reconnect signal bus connector EZX23.
- - Reconnect CAN connector EZX43-1.
- - Switch ON the generator.

- Reset the generator

There are no changes which can be recognized at first sight.

It indicates "Tube statistic data invalid" as the tube load table changed its format.

All tube counters of the predecessor release are empty after flash load of release 3.8 if the original firmware was <3.5 before.

Details and a table of the new counter table can be found in chapter 3. "Exposure counter" at the end of this manual.

No programming screen has to be adapted to the new level 8 of release 3 after the flash load, but some changes of settings have to be carried out:

Bucky TH, TH2 :

(see pages 2Z-2.2 + 2Z-2.5 + 2Z-2.7)
in the Optimus service manual.

RGDV 2 Data Set B

(see pages 2Z-2.2 + 2Z-2.5 + 2Z-2.7)
in the Optimus service manual.

Underexposure display (non automatic techniques): **Yes**

2.7.1.1 Names in the screen

AGent / Program / RGDV set A + B / RGDV 1 ... 8 / Data Set A
of the programmed "Mounted radiographic controller"
changed from

Bucky Controller 1 into Bucky Ctrl. 1/Dig.Diag.

2.7.2 APR data

If APR data have to be adapted to the different max. dose corrections, re-load the modified APR data file to the generator now.

2.7.3 Error log

The error log index can be erased if there are no entries which require service work:

AGent / Fault Find / Error Log

Click on "Clear" with the left mouse button.

3 EXPOSURE COUNTER

Before handing over the generator to the customer, read the exposure counter.

Use menu:

Acceptance / Inspect / Tube 1 ... 3 / Type and statistic of Tube 1 ... 3

Record the figure in the table below.

NOTE



Tube load statistic variables written on a grey background and marked by a "" are visible but do not affect the functions of this generator RAD type. (They are made for generators R/F version).*

Tube load statistic variable	Unit	Tube1	Tube 2	Tube 3
Reset date	dd.mm.yy			
Last update	dd.mm.yy			
Preparation time large focus	s			
Preparation time small focus	S			
Preparation time vario focus	S			
Preparation counter large focus	1			
Preparation counter small focus	1			
Preparation counter vario focus	1			
* Fluoro time	min			
* Fluoro counter	1			
Exposure counter large focus	1			
Exposure counter small focus	1			
Exposure counter vario focus	1			
Overload exposures counter large focus	1			
Overload exposures counter small focus	1			
Overload exposures counter vario focus	1			

The tables should be reset whenever the tubes are being replaced.

Use menu:

Acceptance / Inspect / Tube 1 ... 3 / Type and statistic of Tube 1 ... 3

Click on "Reset" with the left mouse button.

Record the figure in the table above.

Type and Statistic of Tube 1 [?] [X]

Menu/Acceptance/Inspect/Tube 1

[OK] [Save] [Reset] [Help On]

Type of Tube

SR033100-ROT350

Tube Statistic

reset date	30.05.01
last update	26.03.04
preparation time large focus	16390
preparation time small focus	6525
preparation time vario focus	2
preparation counter large focus	4094
preparation counter small focus	5205
preparation counter vario focus	1
fluoro time	85
fluoro counter	548
exposure counter large focus	5047
exposure counter small focus	5364
exposure counter vario focus	1
overload exposure counter large focus	0
overload exposure counter small focus	4
overload exposure counter vario focus	0

Explanation:

Reset date / Last update:

Reset date and date of last update of the tube statistics.

Preparation time:

The sum of all preparation times per focus.

Preparation counter:

Counts the occurrences of transition STANDBY or FLUORO to PREPARATION per focus.

*** Fluoro time:**

The sum of all fluoro times.

*** Fluoro counter:**

Counts the fluoro commands.

Exposure counter:

Counts the exposures per focus (including the overload exposures).

Overload exposures counter:

Counts the exposures at overload conditions of the tube.

4 FINISHING WORK

- Close the cabinet.

INSTALLED BASE REGISTRATION – FSE NOTE:

This FCO has impact on the installed base registration so make sure you update your local installed base registration.

PARTS DISPOSAL:

N/A

DOCUMENTATION:

- Log this action in the section "History Record" of the System Reference Manual.
- File this FCO in the section "Service Information" of the System Reference Manual.
- Fill out the attached Action Notification Report and send it to your SSD Customer Support Manager.

ACTION NOTIFICATION REPORT:

If required, fill out the attached ANR (Action Notification Report) and send it to your local GS&S Key Market / Country Customer Services or FCO manager.

